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Ehealth: Market Potential and Business Strategies

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Abstract

Due to the economic and social priorities afforded health services in the United States, research on new delivery modalities such as the Internet is gaining in popularity. Claims of the Internet's potential range from a promise to revolutionize the fundamental way health care is delivered to a tool for empowering patients through enhanced interaction with providers (Rice, 2001). Even though a great amount of attention has been given to e-health activity, the preponderance of publications to date has focused on the Internet as a source of health information. However important this form of e-health is, this type of service simply does not face the same constraints that must be addressed by those actually delivering health care services or tightly regulated pharmaceutical products. In this paper, we examine e-health by focusing explicitly on the delivery of health care products and services. Our examination of

e-health activity is guided by two broad research questions. First, we ask what the potential is for the development of online health care services by examining its potential in major health care service and product sectors. Second, based upon case studies of two online health service firms, we seek to understand the emerging strategies of firms that are attempting to enter the health care market with an entirely online approach. Our examination of current e-health trends, as well as our two case studies, demonstrates the tremendous potential for health-related commercial activity on the Internet. However, our examination of the barriers facing ehealth from the US health system also pointed out the almost insurmountable challenges. We therefore conclude that a "click and mortar" model may perhaps be the optimal strategy for e-health.

Ehealth: Market Potential and Business Strategies

Health care in the United States has evolved over this century from a service accessed by a small percentage of society to one of the biggest market sectors in our economy. The Healthcare Financing Administration (1999) reports that the nation's total spending for health care will increase from $1.0 trillion in 1996 to $2.1 trillion in 2007. This growth represents an increase in health care costs as a percentage of gross domestic product (GDP) from 13.6 percent to almost 17 percent. These national trends in health expenditures are attributed to a boost in underlying demand for medical services resulting from a recent growth in real per capita income accompanied by increasing medical inflation. Patterns in health care growth, however, vary widely across types of services. It is anticipated that hospital growth will fall well short of the increase in physician and professional services as the trend from inpatient to outpatient care continues. The fastest growing segment of health care expenditures is projected to be for drugs due to an increase in the number of actual prescriptions and changes in the size and mix of medications. This paper addresses the dramatic growth in healthcare expenditures through the examination of a new delivery modality, namely e-health.

Due to the economic and social priorities afforded health services in the United States, research on new delivery modalities is gaining in popularity. New communication technologies, such as the Internet, are enjoying particular attention by health researchers. Claims of the Internet's potential range from a promise to revolutionize the fundamental way health care is delivered to a tool for empowering patients through enhanced interaction with providers (Rice, 2001). Wherever web-based medicine eventually lands, it is currently generating excitement as a means of providing care for two segments of the American population.

First on the list are citizens who currently have trouble accessing a wide range of health care services. Despite the abundance of health providers and companies in this country, people with preventable or manageable health problems are often those least likely to have access to health services. Among those with the greatest challenges in accessing care are residents living in remote areas, facing transportation problems, suffering from physical or emotional handicaps, or living with lower incomes or poor health insurance coverage. Recent federal investment and commitment to telehealth, the use of telecommunication technologies to deliver health services over a distance, indicates that the federal government views computer-mediated technologies as a potential solution for some portion of these access challenges. According to Carolyn Bloch (2001), the Federal Government will spend close to one billion dollars this year on telemedicine research, grants and other funding.

The second audience serving as a driving force behind the development of Internet-based health care services involves the "21st century health care consumers." The Institute for the Future describes a such new consumers as people actively involved in making choices about their health services (Kyrouz, Holt, Mittman, & Everett, 1998). New consumers are made unique by the 3 "C"s, namely cash, college, and computers. New consumers' expectations about how they will obtain online health services are shaped by their experiences with retailers and financial services firms. They will expect free choice when it comes to doctors and treatments they will receive and high levels of customer service (Mittman & Cain, 2001).

New consumers are behind two factors driving the growth of online health services, specifically consumer demands and consumer experience with Internet transactions. Other factors driving online health include characteristics of the Internet, e.g., inexpensive, ease of use, democratic nature, distance insensitivity and increasing functionality (Mittman & Cain, 1999). However, another factor pushing health services online comes from the very pressures within the health care industry.

The health-care industry, which now competes voraciously for every heath-care dollar, is witnessing a convergence of care suppliers, payer sources, providers, and consumers. With this emerging interdependence comes the heightened need for ubiquitous access to information and services that help industry members confront some of the universal challenges, including pressures to reduce costs, intense competition, the complexities of managing information as people and companies integrate, and an ongoing need to gain and retain a competitive advantage through growth and diversification (Deloitte Research, 1999). As the lines that distinguish the various health sectors begin to blur, online commercial activity (e-commerce) emerges as a strategic resource to purchase as well as sell products and services within and between health providers.

However, the development of e-health is currently challenged by a number of issues that appear to be inhibiting its deployment. Among the greatest of these barriers are legal and regulatory issues such as privacy, licensure and reimbursement policies; delivery of care difficulties arising from limitations of the technology, and the changes in the relational component of provider-patient interactions that can influence patients' trust.

Even though a great amount of attention has been given to e-health activity, the preponderance of publications to date has focused on the Internet as a source of health information. For example, many researchers are examining the veracity and type of health information available on the Web (e.g., Berland, 2001; Eysenbach, 1998; Julian, 2001; Pace, 2001). However important this form of e-health is, this type of service simply does not face the same constraints that must be addressed by those actually delivering health care services or tightly regulated pharmaceutical products. In this paper, we examine e-health by focusing explicitly on the delivery of health care products and services. Our examination of e-health activity is guided by two broad research questions. First, we ask what the potential is for the development of online health care services by examining its potential in major health care service and product sectors. Second, based upon case studies of two online health service firms, we seek to understand the emerging strategies of firms that are attempting to enter the health care market with an entirely online approach.

Research Question 1: What is the potential of online health activity?

In order to understand the current and future role of e-health, it is important to look briefly at current utilization, delineate the categories of products/services available

commercially online, and identify the barriers and challenges facing e-health firms.

Current Utilization

General use of the Internet for health points to a great demand for health-related information. For example, almost half the Internet users in 1997 reported looking for health information or support (FIND/SVP, 1997). A survey of 2,000 Internet users estimated that more than 24.8 million people sought online health and medical content in 1998, an increase of 44% from 1997 ("Double Mastectomy," 1999). E-health web sites have enjoyed growth that has outpaced general Internet use. For example, in 1999, general use of e-health sites grew 176% to almost 11 million (Media Metrix, 2000). According to Newsweek, the Web is currently a source of health or medical information for more than 50 million Americans. Patients and their families do more actual web surfing than investors, students or people who purchase online (Watson, 2001). Data from Forrester Research (Yonish, Ranguelova, Shrier, & Broadben, 2001) indicates that women are twice as likely as men to visit health sites. In addition, Internet users diagnosed with a serious illness in the past year, whether young or old, visit medical information sites more frequently than their healthier cohorts. A 1999 study reported in Nature documented more than 15,000 health information Web sites categorized at the prime tier of both the Yahoo and Netscape directories. Yet, health information on the web is not limited to simple non-interactive informational sites. For example, there are many specialized online support groups that offer active mailing lists. Rice (2001) reported that a search on Liszt.com yielded 278 health-related mailing lists. In 1995, the last date individual newsgroup readership figures were provided (Rice, 2001); half of the top 10 Usenet newsgroups were concerned with health topics.

In addition to being a source for health or medical information, the Web is also a site for health-related commercial activity. With respect to online health purchasing behavior, of those who go online three times per week (defined as active Web users), more than 6 percent purchased nonprescription health products, almost 9 percent purchased prescription medications and just under 6 percent bought some type of formal healthcare service (Yonish et al., 2001). To date, an estimated 2.5 million consumers have actually used a medical practice Web site, but more than 35 million report that they would like to (Guglielmo, 2001). Physicians are hearing this message. Up to 37 percent of all physicians already have some kind of Web presence and a quarter of net-connected physicians use e-mail to communicate with patients (Guglielmo, 2001).

E-health as a commercial activity can be schematically conceptualized as four major categories, namely medical equipment and supplies, health insurance, medications and clinical services (Whitten, Steinfeld, & Hellmich, 2001)

Medical Equipment and Supplies

Health commodity items are perhaps the easiest to transition from traditional hard copy catalogs to online publications. Traditionally, health providers must work through a company sales representative or distribution middleman in order to purchase medical equipment and supplies for their clinics or offices. The web offers an opportunity for staff to shop on the web for everything from hospital beds to bedpans and tongue depressors. This category refers to all items that are tangible and require physical transportation for delivery.

There are two separate sets of potential clients for medical equipment and supplies. The first are industry members. These would include hospitals, doctors' offices,

outpatient health centers, home health agencies, nursing homes, and medical laboratories. Any organization that provides direct or indirect patient services is able to purchase equipment and supplies necessary to supply that care through these web sites. The second set of clients for this category is comprised of the care recipients. This would include the actual patient or a family member or non-professional caretaker of a patient. There is a host of medical equipment and supplies that are directly purchased by the actual patient such as special functioning beds, wheelchairs, canes, glucose monitors and strips, blood pressure monitors, or bulk items such as wound care dressings and bandages. It appears that the preponderance of e-commerce sites currently being developed are directed at businesses rather than individuals, which is logical given current computer dissemination and utilization trends.

Health Insurance

Payers of health services obviously play a pivotal role in the entire health system. Currently, most health insurance companies are utilizing the web for informational purposes. However, some companies are utilizing e-commerce in one of two ways. First, following the traditional independent agent structure of the insurance system, insurance companies use the Web to enable agents to order policies for their clients electronically. Second, insurance companies are utilizing the Internet to bypass independent agents, and sell health insurance policies directly to the end consumer. Some sites provide consumers with electronic forms to speed up the process of obtaining health insurance. Other sites go a step further and actually support the online purchase of health insurance.

Medication

Consumers use a wide range of prescription and over-the-counter medications for prevention and treatment purposes. Medications include anything traditionally provided in the health section of a supermarket or drug store or products supplied only through a physician's prescription. E-commerce sites offering medication products are emerging in three distinct forms: [1] online sales of over-the-counter medications that are delivered directly to the consumer; [2] ordering of prescription medications on-line that can be picked up by the consumer or delivered directly to the home or office and; [3] direct marketing with on-line consultation service for a specific product available by prescription only.

Clinical Services

The Internet serves as an innovative source for the actual acquisition of medical care and services. The purchasing of medical diagnoses, treatment recommendations, ongoing care management, or a simple second opinion from a licensed health provider falls in this category. These services could be theoretically purchased from a physician, nurse, nurse practitioner, physician assistant, psychologist, social worker, or speech/physical/occupational therapists. Currently, the handful of forays into cybermedicine appears to be coming from a few enterprising physicians who have set up medical practices on the Web. In these practices, patients log onto the Internet, type in a description of their symptoms accompanied by a credit card number and are then connected to a real doctor who offers a diagnosis as well as a prescription if warranted. This new service is often touted for its potential to solve the issue of access for people who are unable to see a physician in her office due to geographic, economic or time constraints. However, the practice of medicine is a highly regulated business and this modality of service raises a number of perplexing questions ranging from licensure requirements to efficacy of care. Additionally, there are worries that

Internet-based clinical service provision opens the door to increased probability of misrepresentation of health provider credentials, as well as patient attempts to fake illness in order to obtain prescription drugs.

Though health information on the web is obviously popular and an important application, it is not challenged by the many stringent health guidelines and requirements that confront the other categories of e-health firms. Specifically, online pharmacies and clinical providers face the same strict legal and delivery-based barriers that confront traditional health firms.

Barriers to Provision of Online Health Services

The US Department of Health and Human Services recently submitted its Telemedicine Report to Congress for FY 2001 (Health and Human Services, 2001). The report, released in May 2001, describes the key issues facing the telehealth industry. The report states that the some of the issues have been present over the past several years but are now moving to the forefront with the widespread adoption of the Internet. The report includes the following five issues as the biggest challenges facing delivery of health services and products online:

- Lack of Reimbursement-Congress has introduced nine bills to deal with reimbursement. On December 20, 2000, Congress passed legislation that eliminated fee splits and telepresenter requirements, expanded the types of allowable health providers eligible to present patients via video conferencing to a distant specialist, and increased the geographic rural area limits for reimbursement. Important to note is the assumption that online services will mirror traditional delivery of care with such assumptions that a health provider will be onsite to present a patient to a consulting provider in real time. In addition, e-health is potentially blind to geography. With current telehealth legislation, potential consumers residing anyplace other than designated rural areas will not be eligible for reimbursement.
- Legal Issues-Cross-state licensure is still an issue. In essence, a health provider or pharmacy must be licensed in every state in which it serves clients. The paperwork and fees for licensure in multiple states is not insignificant. However, online providers must also comply with this strict requirement. The federal government is particularly interested on illegal online pharmaceutical sales. In FY 2001, the Federal Drug Administration initiated 40 Internet-related investigations and is continuing to investigate suspected criminal activity related to Internet drug sales. Of the 130 currently open Internet-related investigations, 64 are Internet pharmacy cases where the focus is on the possible dispensing of prescription drugs without a prescription. So far, the FDA has initiated 285 Internet investigations and has made 88 Internet-related arrests.
- Safety and Standards-Widely adopted standards and guidelines are considered vital. Without widely adopted standards and guidelines, interoperability and interconnection of equipment could pose a problem as ehealth providers attempt to utilize peripheral medical and data transmission devices. In addition to technical standards, HHS calls for clinical protocols and guidelines to ensure an acceptable minimum standard of care is provided online.
- Privacy, security, and confidentiality-The Health Insurance Portability and Accountability Act (HIPAA) mandates privacy rules that became effective in April, 2001. While the most publicized aspect of this bill is its assurance of health insurance portability, it also contains key provisions designed to guarantee the security and privacy of health information and to enforce standards for electronically transmitted health information. Because privacy is a top priority among health consumers, enactment of HIPAA's privacy standards eventually

promised to remove one of the most significant barriers to e-health activities. However, the current act does not clearly delineate what is necessary for an online firm to be in formal compliance with HIPAA guidelines.
- Telecommunications Infrastructure-HHS is concerned about the existence of an adequate spectrum for future e-health applications. In order for online providers to provide services such as smooth videoconferencing or telemetry, consumers and providers will require an infrastructure that offers affordable broadband solutions.

In addition to the legal and regulatory challenges faced by e-health providers, there are also barriers related to the delivery of health services. Rice (2001) explains another key barrier, namely the patient-provider relationship. The communication between a patient and physician "has a tremendous impact on the quality of health care" (Harris and Associates, 1997, p.1). Health communication literature in this field documents that patients believe that their physicians don't listen well and provide explanations that are confusing. As a result, many patients avoid seeing their doctors and postpone obtaining medical advice (Harris and Associates, 1997). Somehow, online providers must manipulate an electronic medium to address these communication challenges. After all, patients will be unwilling to receive care through this medium if the communication interaction is inferior to a less-than-perfect traditional visit.

Another significant challenge can be found in provider ambivalence (Mittman & Cain, 2001). Currently, the medical culture in the United States is extremely cautious and conservative. Physician practices have adopted information technologies at significant rates for routine administrative functions such as scheduling or electronic claims. Physicians are, however, simultaneously threatened and fascinated by the Web. They understand the value of well-informed patients yet also worry about losing control over the interactions they have with patients (Mittman & Cain, 2001).

During the past five years, online health activity has grown so that it must be taken seriously. Use of the web for health information has enjoyed the greatest activity to date, due in large part to its ability to avoid many of the barriers confronting those wishing to provide actual health services and products online. Because this unique niche of online providers receives so little attention in the academic literature, we now turn to a case study of two such online firms to address the business strategies employed by pure online health service firms.

Research Question 2: What are the competitive strategies and business models of e-health companies?

In order to understand more fully how e-health services are evolving, we conducted case studies of two online firms - one an electronic pharmacy, and one providing actual online physician consultation services. We chose these two areas because they are among the most visible e-health services today, involve some of the thorniest policy issues in the emerging e-health sector, and represent a more revolutionary approach to e-health than cases where online services are mainly used to supplement an existing physical business or clinical practice.

Before providing a brief overview of the cases, we first introduce a basic framework for understanding the competitive strategy and business models of e-commerce firms. We then use this framework to structure our presentation of the cases.

Business Models and Competitive Strategy in Electronic Commerce

E-commerce firms in many ways are no different from traditional firms in terms of the basic competitive strategies they employ. The competitive strategy literature, best represented by the works of Michael Porter (Porter, 1980, 1985) suggests that firms basically follow two generic strategies to gain a competitive edge in their industries: 1) they either seek to obtain a leadership position in terms of their costs of doing business, allowing them to charge equivalent prices to competitors while enjoying larger profits, or 2) they attempt to differentiate themselves from competitors, positioning their products and services as premium goods that can demand a higher price. Substrategies within these two areas involve focusing on specific segments of a market for each versus pursuing a broad mass market in the given industry.

Information technology researchers have extended the basic competitive strategy approach, by showing how the creative use of information and telecommunications technologies to link to customers can be used to pursue these generic competitive strategies. In particular, IT and telecommunications networks have been used to lower the costs of many value chain activities (e.g., improving coordination with suppliers, reducing inventory holding costs), differentiate firms (e.g., offering an 800 number for customers to call in at no expense), and to extend reach into new markets (e.g., telephone and online ordering via catalogue) (Porter & Millar, 1985). An interesting side effect of the use of IT and telecommunications networks is that it helps firms create "lock-in" in various ways - that is, it enables sellers to raise the costs their buyers would incur if they attempted to switch to a new vendor. Higher switching costs arise particularly as buyers make investments in hardware, software and know-how in order to do business in this way, and firms exploit the captured transaction histories in network-based exchanges to provide useful services to customers (Bakos & Treacy, 1986; Johnston & Vitale, 1988; Steinfield, Chan & Kraut, 2000; Shapiro & Varian, 1999).

Today, as e-commerce continues to develop, these basic competitive strategies underlie many of the emerging Internet-based businesses. Transaction cost theory is often used to explain the mechanisms by which networks help firms achieve competitive advantages (Steinfield, Kraut & Plummer, 1995). Essentially, Internet firms attempt to compete with traditional ones by taking advantage of the dramatic cost savings they can enjoy due to the ability to enter markets without a physical presence (Steinfield & Whitten, 1999). Buyers take advantage of the lower search costs afforded by the network, enabling distant suppliers of goods to compete with local ones. Internet firms can save both on building costs and inventory holding costs. Additionally, because most transactions are automated, they hope to obtain a cost advantage through lower labor costs. Internet firms also seek to differentiate themselves by offering such conveniences as seven-day, twenty-four hour access, useful product-related information, software agents that provide comparison shopping information, community-building services such as online discussions with other customers, online help and after-sales services, and many other many value-added services (Steinfield & Whitten, 1999). It is important to note that IT in general, and the Internet in particular, allow firms to generate new sources of revenue from these value-added services, in addition to the other benefits that the Internet provides in terms of cost savings and differentiation.

Because of the many novel ways in which Internet-based businesses have sought to carve out their niche in the marketplace, e-commerce researchers also have focused on the basic business models through which products and services are provided and revenues obtained (Rappa, 2001; Timmer, 1998). Rappa (2001) defines a business model as "the method of doing business by which a company can sustain itself -- that is, generate revenue. The business model spells out how a company makes money by specifying where it is positioned in the value chain." Among the more common

e-commerce business models noted by Rappa are: 1) a variety of forms of electronic brokerage in which Internet firms match buyers and sellers usually in return for a commission on transactions, 2) advertiser models where information, goods or services are offered for free or below cost to end consumers to build traffic, allowing revenues to be obtained from advertising, 3) infomediary models, where Internet firms gather data about the consumers who visit their Web site and use their services and then sell this market data to other firms, 4) merchant models where firms derive revenue simply from selling products online much as retailers sell them offline, 5) manufacturer models where producers of goods bypass their traditional downstream channels and sell directly to end buyers, 6) affiliate models where firms attract visitors and direct them to other vendors' sites, and then receive commissions from these other vendors, 7) community models where end users provide content for each other, usually allowing the host Internet firm to derive advertising revenue from the traffic that is generated, and finally 8) subscription and utility models, where firms offer information or services on either on a flat-rate basis (e.g., monthly subscription for unlimited use) or a metered (pay-per-use) basis, respectively. Although it is possible to separate out these various approaches to generating revenue in e-commerce, in reality most Internet firms rely on various combinations in order to sustain themselves.

Unfortunately, most of these business models have not proven to be successful for the vast majority of Internet firms (often called digital pureplays or dot.coms). Over the past several years, the pure Internet model has given way to hybrid forms of e-commerce, whereby firms combine their traditional brick and mortar businesses with e-commerce (see Steinfield, Bouwman & Adelaar, 2001; Steinfield et al., 2001). Steinfield et al., (2001) suggest that such "click and mortar" firms obtain competitive advantages from cost reductions, value-added services and extension into new markets made possible by exploiting the synergies between their physical and virtual presence. In addition, and perhaps of critical importance for e-health, click and mortar firms can rely on their physical presence to help establish trust and lower consumers' risks for the use of online services.

The Case Studies

Given the above theoretical background on e-commerce, we can now explore the business models and competitive strategies found in the two e-health pureplay businesses. For this study, the researchers employed a case study methodology, which afforded the researchers the ability to study the phenomenon in-depth and allow organizational members to describe their world as they see it, rather than how a researcher has predetermined it to exist (Yin, 1994). Two ehealth service firms consented to this study, both of which operate in the eHealth arena, but offer different health care services to their consumers. One company (dubbed ePharmacy) focuses exclusively on the sale of prescription pharmaceuticals and over-the-counter health products. Through its online pharmacy, customers can purchase prescription and OTC drugs, as well as a wide selection of other healthcare products in a secure manner from their homes or workplaces, 24 hours a day, seven days a week, with a simple point and click on a personal computer. In contrast, the other online health firm (dubbed eDoctor) is one of the Internet's dominant sites for real time online medical consultations, where the majority of consultations result from emergency room and doctor's office consultations, both domestic and abroad.

The researchers employed two qualitative data collection techniques. First, in-depth phone interviews were conducted with corporate officers in each firm (e.g., Chief Financial Officer, Chief Operating Officer, Marketing Director, etc.) in order to reveal

the internal organizational structure and business trends of the companies, interface issues, marketing strategies, as well as comparing and contrasting the online health world to the traditional health care realm. In addition, archival data such as business plans and websites were analyzed and compared between the companies in order to compare styles, business structures, and technical issues endemic to each company.

An Online Pharmacy

The first case study involved a company that was primarily in the business of selling prescription drugs online. This was a pure Internet startup, rather than an existing pharmacy that added an online channel.

ePharmacy focuses exclusively on the sale of (1) prescription pharmaceuticals, (2) over-the-counter (OTC) pharmaceuticals, (3) vitamins, minerals, supplements (VMS) and herbal products and (4) related healthcare products. The Company has invested over $10 million in state-of-the-art technology and facilities including fully automated pharmaceutical dispensing equipment that enables the company to fulfil customer orders rapidly upon receipt of the order via the Internet. ePharmacy began selling OTC pharmaceuticals and other healthcare products through its website in May 1999 and began sales of prescription drugs and providing healthcare information in late October 1999. With respect to prescription pharmaceuticals, the company had the ability to service over 75 million insured lives as well as the entire cash-pay market which accounts for over 20% of the prescription market.

ePharmacy's target markets include the estimated $120 billion U.S. prescription pharmaceutical market, the estimated $22 billion U.S. OTC pharmaceutical market and the $11 billion U.S. vitamin market. Currently, most of these products are sold through bricks-and-mortar retail pharmacies and a smaller percentage, particularly prescription pharmaceuticals for chronic conditions, are purchased by mail.

The company's long-term goal involves development of a comprehensive pharmacy services vertical portal-delivering all aspects of pharmacy services to consumers as well as business constituencies within the healthcare industry. The online pharmacy allows customers, via the Internet, to receive comprehensive drug and healthcare information, and correspond privately with pharmacists.

ePharmacy's genesis began in the middle portion of 1998, with three co-founders who believed the Internet could offer a new value and dimension to healthcare. The hiring and operations began in the early part of 1999, and then focused on creating an infrastructure (business and technical) from which to begin. At the time of data collection, ePharmacy employed 150 workers in such departments as marketing, financing, and most importantly, operations. ePharmacy has the facilities to fill between 20,000 to 21,000 prescriptions per day, or about ten thousand in a seven and a half-hour shift. In order to operate at an efficient level, ePharmacy has a fifty-thousand square foot physical location, which houses the automated dispenser that is connected to high levels of interfacing and interconnectivity between the automated dispensing equipment and the rest of the company.

ePharmacy employs the services of United States Postal service, which disseminates their prescriptions as well as any other items such as OTC's and related healthcare products. Shipping is free for prescription orders; however, for all non-prescription items, the cost of shipping is assumed by the consumer. ePharmacy actually subsidizes a portion of the shipping in order to ameliorate the process of doing business on the web, as well as sustaining customer loyalty. Moreover, ePharmacy also provides prescription reminders through the use of email. For example, if an

individual has a prescription for a chronic drug, and the prescription is for more than a single dispense, ePharmacy advises the customer when the refill is coming to an end. In effect, the company is attempting to turn each chronic drug customer into a loyal customer by providing a service that is not readily available from traditional, physical pharmacies.

In order to fully receive service from ePharmacy, customers must provide information such as name, address, and billing information. Payment for all healthcare items usually involves credit cards, but the company also accepts check and money orders when applicable. In addition to traditional e-commerce payment, ePharmacy also accepts third party payers, such insurance companies. Insurance companies normally cover the cost of the prescription. In that case, the customers must provide payment information for their co-pay, and also provide information concerning their insurance company, as well as their coverage plan. Naturally, the company confirms the insurance coverage and the authenticity of the prescription. ePharmacy checks the accuracy of the prescription against the patient's medical history, as well as unearthing and verifying any possible interactions with other drugs.

ePharmacy's Web site offers a reference desk to potential and current customers, which is a database of information relating to drug interaction, vitamin information, and other pharmacy-related information that the customers can access. Further, in-house publications are also available to consumers. The company offers this service to the consumers in order to allay any questions or concerns pertaining to the online, or traditional, pharmaceutical field. ePharmacy feels this combination of products and information affords them an edge in terms of competing for consumers. The site becomes a "one-stop-shop" Web site that offers a vast array of medical and pharmaceutical information.

All information disseminated and originating from the site is fully encrypted, and where there are areas on the site where information is traveling back and forth-it is strictly one-way communication. In addition, the company utilizes secure Web pages to take all orders and to display prescription information. No personal information can be accessed by or released to any third-party, doctor, etc. without consent. All information is stored in a secure database behind a firewall. Customer accounts are accessible over the Internet only by entering a user name and password. Presently, ePharmacy uses Secure Socket Layer (SSL) software, a security standard supported by common Web browser software, including Microsoft Internet Explorer (3.0 and higher) and Netscape Navigator (2.0 and higher). Sensitive information such as passwords, address, and credit card information is encrypted using 56-bit encryption for transit over the Internet. ePharmacy argues that encryption makes business transactions over the Internet even more secure than purchasing by telephone. While select departments at ePharmacy have access to contact information and aggregate demographic information, only departments with necessary access can view health and insurance information. This site has additional security measures in place to prevent the loss, misuse and alteration of the information under the company's control.

Lessons Learned from ePharmacy

The business model for the online pharmacy is mainly a virtual merchant model, whereby revenues are derived directly from the sales of prescription drugs. Their hope was that due to their lower operating costs, they could offer prescription drugs at prices that were competitive with those of brick and mortar pharmacies. Hence their dominant competitive strategy was to seek a cost leadership position in the pharmacy retail sector.

However, the online pharmacy clearly sought to differentiate itself from brick and mortar-based competitors in a number of ways. Four specific sources of differentiation discussed in the interviews were:

- Convenience. Consumers no longer need to leave home to fill prescriptions, since they could be ordered online and delivered to them at home. This was particularly important for homebound consumers.
- Anonymity and private transactions: For many buyers of prescription drugs, the ability to ask sensitive questions in private, rather than in front of other customers or a pharmacist that they may know outside of the pharmacy, is an advantage.
- Rich information: The ability to complement the provision of drugs with additional content is a distinct advantage. The online pharmacy provided detailed information about the drugs, including potential interactions and side effects.
- After-sales service: The online pharmacy offered a number of after-sales services to prescription drug buyers that would be hard for traditional pharmacies to replicate. This included allowing customers to email any questions they had about taking prescription drugs, and sending automatic reminders when prescriptions should be refilled.

Like many other e-businesses, the online pharmacy took advantage of the ease with which complementary products could be sold on their site. These other products added to the potential sources of revenue.

However, the online pharmacy faced many challenges. The cost of delivery had to be absorbed or added to every sale, and since quantities of prescription drugs are usually not large, little efficiency was possible for home deliveries. In addition, many people obtain prescription drugs only when they become ill, and need medication right away. For these customers, even overnight delivery represents an intolerable delay.

Several challenges result directly from the complex structure of the healthcare industry. The online pharmacy was fighting to be listed as an approved supplier of prescription drugs by the major health insurance companies. Without this, customers would not be reimbursed for their medication expenditures, making it unlikely that they would substitute the online service for a traditional one recognized by their insurance provider. And, even if they could be reimbursed for online prescription drug purchases, the current model requiring customers to pay upfront via credit card is far less attractive for those with prescription drug coverage who only have to make small co-payments or do not have to pay at all at their local traditional pharmacy.

Many of these challenges would not apply to a traditional pharmacy that provided an integrated e-commerce offering to its customers. Indeed, the online pharmacy faced stiff competition from click and mortar pharmacies that offered immediate pick-up of prescription drugs ordered online as well as the advantages of approved coverage by insurance providers. Indeed, as a postscript on this interview, by June of 2001, the online pharmacy has ceased independent operation, and now directed online inquiries for prescription drugs to an established click and mortar pharmacy.

An Online Physician's Consultation Service

The second case study was an online physician consultation service. Founded in July 1999 by three emergency room doctors, eDoctor has a proven business model and the only Internet malpractice insurance policy ever written. A full 60% of the company's demand for consultations comes from abroad. The substantial traffic to the company's site has been generated without advertising or registering with a search

engine. eDoctor estimates that by 2005, 10% of the 1.1 billion annual emergency room and doctor office consultations in the United States will be conducted online. eDoctor enjoys a "first to market" advantage in this rapidly growing field. Specifically, the company provides one-on-one consultations between physicians and patients. The doctors who started the company noticed many people were coming into the emergency room because they had forgotten their prescription somewhere, and to get the prescription, they would need to see a local doctor. This niche need is the primary impetus for eDoctor, but other ancillary factors also played a role in its creation. For example, the founders believed a platform existed for a Web site that dispenses medical information and services for emergency room situations. Further, this company would offer this service to executives or other people traveling abroad who do not have access to their regular medical outlets, or who have just forgotten a prescription. eDoctor is a liaison between the patient, local doctors, and medical services.

eDoctor's target market includes American executives traveling abroad, specifically customers who need medical advice or attention, but cannot locate or reach their primary care physician. The Web site allows consumers to contact and communicate with U.S. trained and certified doctors, and when necessary, these doctors can prescribe medication to the consumer and then overnight the product to the patient. eDoctor has emergency room physicians that are on call, 24 hours a day, seven days a week for those customers requiring immediate attention. Conversely, the company can also set up an appointment and meet with that physician immediately (non-emergency), or if it is a specialist they are interested in, the doctors can arrange that appointment as well.

In order to receive services from the company, patients must log onto the network with a credit cared, as well as divulge medical information, personal information and other ancillary items germane to the specific visit. Since emergency consultations are the major impetus for the company, medical records are not necessary required for all patients due to the uniqueness of the situation. However, the standard medical information is required of the patients (e.g., current medication, past surgeries or ailment, and allergies to medicine). In addition to medical information, the patient must also provide information on their primary care physician in order to relay the information and mediation to the proper outlets, as well as verify the veracity of information supplied to the company by the patient. When a non-emergency situation arises, such as a routine appointment with the company, the patient must provide the primary care information up-front before visiting the doctor-this reduces any liability indemnity as well as increases the potential for assistance. Interestingly, if a patient is seeking an immediate medical consultation from one of the emergency medicine physicians, he or she will first complete payment for the physician's service through the secure CyberCash credit card processing system. Then, the patient will complete the registration form, which includes personal information, past medical history, and review of systems, as well as some specific questions relating to the immediate medical concern.

If a patient is seeking an appointment with one of the other physicians in another specialty, the patient will first go through the secure CyberCash credit card processing system for a credit card authorization, which will not result in a charge to the card; it will verify the validity of the credit card. The patient will then provide preliminary information (personal, past medical history, and nature of the medical problem or question). Next the patient will be brought to the eDoctor's Appointment Center, where she will be able to set up an appointment with the chosen physician. The patient will be given an appointment ID, which will allow reentry to the site for the actual consultation with the doctor. When the patient returns for the appointment, he or she

will fill out the review of systems form and then proceed with the actual consultation. The patient is not charged for the appointment-based consultation until it has concluded.

All patient information on eDoctor is fully encrypted, which means personal medical information and online consultation is secured through SSL encryption, and will not be accessible to anyone other than the company's physician. After the patient has completed the registration process (either for an immediate consultation with one of the Emergency Physicians, or when they return to the company's Web site for an appointment with a non-Emergency physician), she will be brought to the eDoctor's "Doctor's Office," where the physician, after briefly reviewing the supplied patient information, will join the patient in a secure, encrypted, "one-on-one," virtual conference room environment. The physician will then provide the type of service requested during the registration for that visit. There is no "pre-set" format for the dialogue with the physician; the doctor may ask additional questions, depending on the nature of the medical problem, and will help guide the patient through the consultation.

If initiation of medical treatment is deemed warranted by the doctor at the time of consultation, prescription medication can be provided by "pharmacy call-in" by the physician. If the patient is traveling or away from home, the eDoctor physician can arrange delivery of U.S.-formulated prescription medication to almost anywhere in the world. If the patient is seeking an appointment with one of the non-emergency medicine specialists, and needs to submit electronic data such as ultrasounds or x-rays, specific instructions from the physician will be provided at the time of the consultation. At the conclusion of the online consultation, the company's doctor will provide the patient with detailed discharge instructions. Patients may print these by clicking with the mouse on the browser's print button, or else "copy and paste."

Lessons Learned from eDoctor

This e-health firm relies primarily on a brokerage model, serving as an intermediary service that connects patients with physicians for secure e-mail or Internet-based video consultations. Patients can either choose their preferred physician, if their doctor has registered with the service, or allow the service to select a physician for them. Physicians are paid by the e-health service, which retains some portion of the fees paid by patients.

Their primary competitive strategy is a differentiation-focus strategy, allowing them to offer a premium service mainly directed at a particular segment of the market, the international business traveler. As a broker, they must have a strategy to bring both "buyers" (patients) and "sellers" (doctors) into their business. They promote their services to physicians, and also use patients to "pull" their preferred doctors into the service. Given their need to create a critical mass of physicians and patients registered with the service, this service benefits from their "first mover" advantage, since it is unlikely that doctors will want to sign up with more than one such intermediary.

Particularly for international business travelers, their service is differentiated from the alternative source of medical consultation by their ability to offer:

- English-language physician consultations in countries where English is not the native language
- Access to a US trained physician while traveling abroad, including secure email to a patient's regular doctor if enrolled in the service

- Access to prescriptions for familiar drugs which can be delivered almost anywhere in the world
- Immediate access to a physician when needed.

The physician consultation service also faces a number of challenges. Like the online pharmacy, lack of physical presence is a problem when patients need immediate in-person attention or immediate medication. Even with prescription drug delivery, the delays may not be tolerable. In addition, as with the previous case, the reimbursement issues raised by lack of recognition by health insurance companies makes it difficult for patients to choose in preference to a traditional in-person physician consultation. Even though many travelers need to pay in advance of services anyway when obtaining medical treatment abroad, they still are able to obtain reimbursement from their insurance companies. This is not necessarily the case for online consultations. Hence the target market is limited to those who can afford to pay outright for their healthcare, or receive this as an executive perquisite from their companies.

State licensure requirements are another barrier being addressed by this firm. In this case, the strategy to have consumers recruit their own physicians is a smart way to try to pull in doctors already licensed in the states from which patients seek services.

Other challenges faced by this firm follow from their focus on travelers and from their reliance on Internet-based communications only. Internet access may not be available in all locations, or may be so poor that services such as Web-based video do not work. Moreover, there is little possibility to use many of the available phone-based remote diagnostic instruments now becoming more common in telemedicine. Even if Web-based interfaces were developed for these instruments, it is not clear that travelers would always have them on hand.

Despite these problems, the online physicians service has not yet succumbed to the dot.com bust afflicting so many other Internet start-ups. Its first mover advantage, ability to offer some service immediately without the need for physical delivery, focus on linking patients to their own regular and trusted physicians where possible, and clear focus on an unmet need of business travelers are all possible explanations.

Conclusion

Our examination of current e-health trends, as well as our two case studies, demonstrates the tremendous potential for health-related commercial activity on the Internet. Accessibility to health services via the Web adds value in many ways that go beyond simple cost efficiencies. For example, the ePharmacy firm demonstrated the potential for more private and personal communication with an online pharmacist. A customer does not need to yell a personal or embarrassing question to the pharmacist with ten people in line right behind him. Or, the eDoctor company showed us the potential value of accessing care in one's native tongue from anywhere in the world. In addition, the prospect of immediate access to care, 24 hours a day, seven days a week might prove quite appealing to niche markets such as travelers. Clearly, there are health service needs not currently being met in the US health system.

However, our examination of the barriers facing ehealth from the US health system also pointed out the almost insurmountable challenges. Requiring a physician or pharmacist to hold a current license in every state in which they service a client is expensive and time consuming. Perhaps the greatest barrier is found in how health care is paid for in the United States. Online health providers cannot currently compete

with health care that is paid for by third party payers. In addition to the uphill battle to persuade insurance companies to pay for these services, these online health providers are trying to persuade an American culture used to "having someone else pay the majority of their health care costs" that they should pay for these health services out of their own pockets. So, in addition to the legal and regulatory requirements, online health firms are also trying to shift many cultural norms enshrined in the US health delivery system.

Recent moves towards integration with traditional businesses or pre-existing health care providers provide preliminary evidence that the click and mortar model may perhaps be the optimal strategy for e-health. The best chance for success in the delivery of online health services may exist through the combination of a traditional business with a physical site and a convenient Web presence. The physical location permits easier compliance with extant legal and regulatory requirements. The Web site enables providers to tap into additional value-added services that customers may demand as the health care market grows increasingly competitive. Indeed, we may find that health care organizations wishing to thrive will be required to provide care through a new click and mortar paradigm of care.

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